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The influence of internationalised versus local content on online intercultural collaboration in groups: A randomised control trial study in a statistics course

Jenna Mittelmeier, Bart Rienties, Dirk Tempelaar, Garron Hillaire, Denise Whitelock

Abstract

Computer-supported collaborative learning (CSCL) has been highlighted as a beneficial learning experience for students in blended and online settings. In highly diverse and international contexts, CSCL also allows students the opportunity to encounter new ideas and values from peers with different backgrounds. However, previous research has highlighted that there are wide variations in student participation levels in CSCL activities and that many students experience social and cultural tensions when working with diverse peers. These issues may damage the quality of online collaboration and limit the potential gains of CSCL. In this study, we explored one evidence-based solution for encouraging CSCL participation: the internationalisation of the online academic content used for collaborative activities. Using a randomised control trial method with 428 undergraduate students in an introductory statistics course, we compared individual and group-level participation in an online collaborative task when students used content from the local context compared to content from international contexts. Our findings suggest that internationalisation of online content can encourage individual-level participation and decrease the disparity of participation within small groups when the content is situated in countries that are personally relevant to students' own backgrounds. At the same time, participation was influenced by individual demographics and group dynamics.

Keywords

Cooperative/collaborative learning; cross-cultural projects; improving classroom teaching; interactive learning environments

1. Introduction

Computer-supported collaborative learning (CSCL) has been found to positively support students' learning by increasing knowledge exchanges (Bliss & Lawrence, 2009; Resta & Laferrière, 2007; Schellens & Valcke, 2005) and encouraging connections between students (Bernard et al., 2009; Dawson, 2006). Yet, recent research has also demonstrated wide variations in participation levels between students (Caspi, Gorsky, & Chajut, 2003; Hämäläinen & Arvaja, 2009; Strijbos & de Laat, 2010; Wise, Perera, Hsiao, Speer, & Marbouti, 2012), which ultimately hinder the collaboration experience. Barriers to effective communication in CSCL are especially prevalent when students are from diverse backgrounds (Angeli & Schwartz, 2016; Stahl, Maznevski, Voigt, & Jonsen, 2010), which suggests a need for more research into evidence-based interventions that can help support online intercultural collaborations.

One suggested intervention is the internationalisation of academic content, which incorporates diverse and multicultural online materials into CSCL assignments. For example, a statistics course might ask students to analyse data and case studies from international contexts in addition to assignments based in the country where the university is located. After all, related research has suggested that internationalising the content used for collaborative activities may encourage participation and engagement (Arkoudis et al., 2013; de Haan & Sherry, 2012). Yet, few empirical studies have tested this notion, particularly against a baseline condition of 'local' content with materials from within the host country context. To address this gap, this study utilises a randomised control trial method with 428 undergraduate participants from a highly diverse introductory statistics course to test how the internationalisation of online content in an intercultural CSCL activity impacts participation. In the following sections, we highlight relevant research on participation in CSCL, intercultural collaboration and internationalised academic content.

1.1 Participation variations in CSCL

A wide variety of literature has highlighted that CSCL can benefit students' learning experiences (see, for example: Resta & Laferrière, 2007; Schellens & Valcke, 2005). For instance, Bernard et al. (2009)

highlighted student-to-student interaction as one of three interaction types that can increase student engagement in online courses. Research has also found that online collaboration tools can enhance students' sense of community (Dawson, 2006), increase the knowledge flow between students (Bliss & Lawrence, 2009), and encourage overall participation (Bliss & Lawrence, 2009; Hrastinski, 2006). Online collaboration additionally leaves behind data traces which can be used to develop and evaluate effective teacher interventions (van Leeuwen, Janssen, Erkens, & Brekelmans, 2014).

At the same time, it has been found that individual learners participate and engage in online collaboration in different, and often unequal, ways, which limits these potential benefits. For instance, Caspi et al. (2003) found in an analysis of asynchronous forum posts that 80% of students contributed only 20% of posts. Wise et al. (2012) similarly highlighted wide variations in students' interaction types and motivations for communication. Hämäläinen and Arvaja (2009) found that some students participated minimally in CSCL activities, even when assigned specific roles or tasks within their groups. For this reason, several researchers have categorised participation in CSCL according to wide variations in contributions amounts between group members (for example: Author B & Author C, 2009; Slof, Nijdam, & Janssen, 2016; Strijbos & de Laat, 2010).

Similar variations have been demonstrated on a group level. For example, in a qualitative analysis of online group work activities, Oliveira, Tinoca, and Pereira (2011) identified that some groups were more successful in their collaboration than others. Fransen, Weinberger, and Kirschner (2013) similarly noted wide variations between small groups in CSCL in terms of teamwork effectiveness and emphasised the importance of more equal participation among group members. Indeed, participation equality within groups has been highlighted by Decuyper, Dochy, and Van den Bossche (2010) as an important component for successful developments of team shared mental models.

Although participation is, of course, about more than just 'quantity,' the number of messages or posts contributed in a CSCL activity is telling, as previous research has noted that more messages are indicative of higher quality conversations (Author B & Author C, 2009; Hou & Wu, 2011; Schellens & Valcke, 2005). For instance, in research areas such as Massive Open Online Courses (MOOCs), a clear link has been found between the number of posts submitted to online collaboration forums and overall performance (Alario-Hoyos, Muñoz-Merino, Pérez-Sanagustín, Delgado Kloos, & Parada G, 2016). These variations in participation levels are also important from a student experience perspective; one consequence of unequal participation is negative perceptions of working with peers from different countries. For example, in a questionnaire of domestic and international students, Popov et al. (2012) found 'free-riding' (i.e. the tendency for some students to not contribute much to group work) was the top complaint of participants in intercultural group work. This has been confirmed in further work in face-to-face (Hall & Buzwell, 2013; Spencer-Oatey & Dauber, 2017) and online settings (Capdeferro & Romero, 2012). Through an analysis of student learning journals, Turner (2009) also discovered that free-riding and frequent 'silence' were commonly noted by participants. In response to this, Maiden and Perry (2011) outlined that students appreciated any attempts for teachers to moderate or address participation variations in group activities. However, effective interventions to improve CSCL participation require an understanding of *why* participation varies between students. One important area of attention is the sociocultural tensions that students may encounter as a result of working with peers from different backgrounds, which is discussed next.

1.2 Collaboration with diverse participants

As higher education rapidly diversifies in blended and online learning settings (OECD, 2016), CSCL increasingly offers students the opportunity to work with peers from different countries. These opportunities are beneficial to the learning experience, as contact with diverse peers allows students to encounter new ideas and increase their cultural awareness (Levin, 2005). Interaction with diverse peers during university has similarly been linked with higher thought complexity and openness (Pascarella & Terenzini, 2005). Intercultural collaboration has also been found to help students develop key graduate employability skills, such as intercultural competencies (Spencer-Oatey & Dauber, 2017), which are frequently desired by employers (see, for example: Tymon & Mackay, 2016).

However, many barriers to successful intercultural collaboration exist, which have been researched extensively in face-to-face settings (for a meta-analysis, see: Stahl et al., 2010). For example,

Harrison and Peacock (2010) highlighted that many domestic students disliked working with international students. Similarly, research has demonstrated that many students prefer to work with peers from their own cultural background (Author B, 2013; Moore & Hampton, 2015). Reasons for these preferences could be that cultural distances between group members make collaboration challenging (Fozdar & Volet, 2012) and induce uncertainty (Strauss, U, & Young, 2011). One further frustration viewed by students in intercultural collaboration is the perception of unequal participation (Author A, Author B, Author C, & Author E, 2017; Popov et al., 2012).

Similar findings have been noted in online settings. For example, in a survey of over 200 international and domestic students, Hannon and D'Netto (2007) highlighted that many students felt there was a lack of communication between peers from different backgrounds in online courses. In a study of students across 28 online courses, Ke and Kwak (2013) found that ethnic background strongly influenced satisfaction with distance education experiences. In CSCL environments, Angeli and Schwartz (2016) outlined in an intercultural comparison of over 800 American and European CSCL participants that students from the same country shared interpersonal knowledge more easily than those from differing backgrounds. In our own research, we found that sociocultural factors, such as cultural background and social network diversity, impacted participation when students worked online with peers from other countries (Author A, Author B, Author C, & Author E, 2016). Diep, Cocquyt, Zhu, and Vanwing (2016) similarly noted that students who participated more in online courses felt a stronger sense of belonging with their peers.

Altogether, it is well-documented that sociocultural tensions can negatively impact successful collaboration in both CSCL and face-to-face formats. It is also clear that more research is now needed to understand best practices for addressing the challenges encountered by students when working with diverse peers. In this study, we focus specifically on the potential of internationalised academic content, which research has previously suggested can improve student participation.

1.3 Internationalised content

Curriculum internationalisation is characterised by the holistic encompassing of international dimensions into the university experience (Leask, 2009), both throughout academic courses and through wider support services and informal university-related activities. In this study, we focus specifically on internationalisation of academic content and materials, which we define in line with previous work (Bodycott, Mak, & Ramburuth, 2014; Leask, 2009; Leask & Carroll, 2011) as the incorporation of international themes or perspectives into the learning materials and scope of academic assignments. For example, students might be asked to work with data or case studies from other countries in addition to their standard work within the local context. Previous research has highlighted that diverse academic content is an essential component of a successfully 'internationalised' curriculum (Bodycott et al., 2014). Leask and Carroll (2011, p. 655) argued that 'tasks and activities must be designed in a way that, because of their very nature, they cannot be completed satisfactorily without meaningful intercultural interaction.'

The benefits of internationalised content and activities have been outlined in previous work. For instance, Caffrey, Neander, Markle, and Stewart (2005) conducted a quasi-experimental study with 32 nursing students using a pre-post test and found that cultural competencies increased as a result of engagement with instructional designs that embedded internationalised content. Tran and Pham (2016) similarly found by interviewing 150 students across 25 Australian vocational schools that engagement with internationalised content and diverse peers were key to the co-creation of 'mutual learning' and development of intercultural competencies. Trahar and Hyland (2011) also conducted focus groups of staff and students and highlighted that students felt 'rewarded' through their experiences with internationalisation due to the opportunities to encounter new ideas and meet people from different backgrounds.

Research has further demonstrated that internationalised academic content can encourage student participation and engagement in classroom activities, including collaborative group work. For instance, de Haan and Sherry (2012) highlighted in a case study analysis increased engagement and co-construction of knowledge between international and domestic students as a result of incorporating internationalised content into group work projects. Also using a case study analysis in combination with satisfaction surveys in an introductory statistics course, Middleton (2014) found that students were more engaged when collaborating with diverse peers after internationalised content was embedded into the

course design. Through a focus groups of 40 teachers, Arkoudis et al. (2013) outlined perceptions that incorporating internationalised content encouraged collaboration between students and increased engagement. In an online context, Xiaojing, Shijuan, Seung-hee, and Richard (2010) similarly found through a case study approach that a lack of internationalised content was detrimental to engagement and participation. While these studies have highlighted potential benefits of internationalised content, most studies have relied on self-reported data and lack appropriate control conditions in the research design. To the best of our knowledge, no empirical study has explicitly tested whether international versus local content actually impacts measurable participation.

One additional ambiguity in current literature is what ‘international’ actually means in the context of academic content. For instance, it has been argued that students’ diverse experiences should serve as a foundation for internationalisation efforts (Bodycott et al., 2014; Leask & Carroll, 2011). Brookes and Becket (2010, p. 387) similarly described international students as ‘ready-made resources’ who can contribute their diverse backgrounds and experiences to illuminate international topics for their peers (Lowe, 2008). However, these sentiments make an assumption that content is personally relevant to students’ lives and draws upon their diverse experiences. Others have noted that incorporating international elements, regardless of whether it is connected with students’ backgrounds, might be enough to elicit the benefits of internationalisation (Knight, 2004). At the same time, an alternative explanation might be that *locally-based* content encourages participation and collaboration. After all, many students may in part choose to study abroad in order to engage with and learn about the local culture (see, for example: Bodycott, 2009). Yet, it is unclear whether simply incorporating diverse content without an explicit connection to students’ backgrounds and knowledge is enough to encourage engagement. Therefore, our study also considers different dimensions of ‘space and place’ of online content (further described in section 2.3).

1.4 Research Questions

Current research has highlighted that students participate in online collaboration unequally, particularly when working with peers from different backgrounds. Similarly, wide variations in participation between groups have been noted, outlining that some groups are more successful than others. At the same time, it has been suggested that internationalised academic content might help encourage students to participate and engage with peers from different countries, which may help balance these inequalities. However, no known study has empirically compared student behaviours in assignments with locally-based (i.e. host country) versus internationalised content, making it difficult to measure the ‘added value’ of internationalisation, especially from the perspective of student participation. Much research on internationalisation is based on self-report or does not use a robust research design in terms of measuring actual student behaviours. Further, no known studies are nested within an online environment, despite the rapid diversification of students enrolled in blended and online courses. Finally, there is more to be probed to unpack and define the meaning of ‘international’ content. Therefore, we also seek to understand variations in measurable student participation when working with internationalised content that is personally relevant and meaningful, compared to content from a randomly assigned non-local locations. Given these gaps, we consider the following research questions in this study:

- 1) How does personally relevant versus randomly assigned internationalised online content impact measurable participation in an intercultural computer-supported collaborative learning (CSCL) activity on an individual level?
- 2) How does internationalised online content impact upon measurable participation in a CSCL activity on a group level?
- 3) How does internationalised online content impact participation equality between diverse group members in a CSCL activity?

As relatively few empirical studies have tested these notions, there is need for exploratory work with respect to the above research questions. Nonetheless, we expect students to submit more to a CSCL activity when working with internationalised online content in comparison to a baseline of ‘local’ content, as current research has suggested that internationalised content can improve participation and engagement (Arkoudis et al., 2013; Middleton, 2014; Xiaojing et al., 2010). We also expect that students

will participate more in a CSCL activity when working with content from their own background, as researchers have previously argued that international students can be engaged as resources in diverse classrooms (Bodycott et al., 2014; Leask & Carroll, 2011).

2. Materials and Methods

2.1 Setting and participants

This study took place in a multi-disciplinary statistics course at a Dutch business school with students in their first undergraduate term. The course was compulsory for all first-year students in the department. This particular academic programme adopts a problem-based learning curriculum with a pedagogy that provides students with ample opportunities to work in groups with their peers, both in person and online (Author C & Author B, 2015). The university also has a highly diverse student population and was ranked in the top 15 of Times Higher Education's 'World's Most International Universities' (Times Higher Education, 2016). Students in this programme frequently work with content and case studies that are international in scope and are explicitly taught skills for communicating and collaborating with diverse peers. Classes in this programme are fully taught in English, meaning the vast majority of students study in a non-native language. Outside the classroom, the university has a vibrant schedule of social programming aimed at intercultural exchange. Altogether, this study looks at student behaviours when using internationalised academic content against the backdrop of an already internationally-minded formal and informal curriculum.

Altogether, 428 participants took part in this study, of which 76.9% ($n = 329$) were international students. Within the international student population, a large group was from Germany ($n = 178$, 41.5%), which is the largest international student subgroup at the wider campus. 24.1% ($n = 99$) of participants were Dutch students. Of the remaining students, 123 were European students representing 23 countries, and 28 were non-European. Only four students were from countries whose primary language was English. In terms of gender, slightly more males than females participated ($n = 259$, 60.5%), which is also representative of the wider student population in this academic programme.

Students attended weekly lectures and breakout small tutorial groups of approximately 14 participants. In addition, participants were assigned to a weekly computer lab. This present study took place during the computer lab session in week six of their first term and analysed measured student participation during one full assignment. Students in the course did receive a participation credit for attending the lab, however, no marks for their performance were given. There was an alternative assignment of equal length for those who did not wish to participate.

2.2 Discussion task and online collaborative learning environment

Participants in this study were randomly divided into small groups of approximately five members ($M = 4.74$ members, $SD = 0.87$) and worked together online using a messenger to communicate (described below). The computer lab was comprised of students from several small tutorial groups, meaning most students groups had not had the opportunity to work with most of their group members previously. As we were interested in culturally diverse groups, care was taken to ensure that at least three or four countries were represented in each group ($M = 3.59$, $SD = 0.84$) through a sampling by the authors prior to the computer lab task. Given their large cohort size, each group typically had one Dutch student ($M = 1.10$, $SD = 0.69$) and one or two German students ($M = 2.03$, $SD = 0.96$). The remaining group members were from one of the 23 represented European countries, while 27% of the small groups also included a non-European group member. Considering that previous work has indicated substantial social and cultural differences (Bilsky, Janik, & Schwartz, 2011; Brodbeck et al., 2000; Hofstede, Hofstede, & Minkov, 2010) and educational practices (Kivinen & Nurmi, 2003) even within small geographic areas in Europe, all students in this activity worked in a truly multicultural and diverse team.

Upon arrival, participants were seated around the computer lab and asked to log into an online platform called Udio (available at: <http://cet.cast.org/udio/>). The Udio platform functions within a web browser and can incorporate any XML-structured content. In this study, PBL case study tasks (outlined below) were incorporated into the Udio platform in the form of group assignments, which described the group work task. Students were given a specific assignment to work on during the lab, along with their group members. Upon opening the assignment, participants used a messenger feature for communication, which was similar in nature to an online chat or instant messenger. A synchronous

online communication method was selected as previous research has found that it can encourage student participation (Hrastinski, 2006). Altogether, the task covered the full scheduled time for one lab session, which was one hour and fifteen minutes long. This allowed for an in-depth look at student participation during one class period and throughout a full academic assignment, an approach that is common in recent CSCL research (see, for example: Hämäläinen & Arvaja, 2009; Hou & Wu, 2011; Slof et al., 2016).

The task itself asked participants to use the World Bank EdStats online database (available at: <http://datatopics.worldbank.org/education/>) to explore real-world education statistics. By focusing the activity on a mathematics and statistics task, we were able to test the effects of internationalisation in the context of content that is often perceived to be culturally 'neutral.' This activity was designed in coordination with the course teacher in order to mimic the style and design of participants' regular academic coursework. Subtle variations were made in the specific task assigned to various groups, which will be described next.

2.3 Randomised control trial design

In order to compare student behaviours and reflections when working with local versus internationalised online content, a randomised control trial design was incorporated into this study. We divided participants into three conditions with subtle variations in the 'space and place' of the online content used in their collaborative activity. Students were allocated to research conditions based on their assigned weekly lab time. In all cases, participants were asked to compare education statistics between countries, which were assigned to their group based on their study condition. Groups in all conditions were asked to discuss their assigned countries with one another and decide collectively which country was most in need of additional resources or funding from the World Bank for education. It was also made clear in both written and verbal instruction that the assignment required them to use their group members' backgrounds and experiences to make inferences beyond the data in order to complete the task. This meant that international and intercultural experiences, particularly in relation to the assigned country, were highly valuable to the group's decision-making process. An example of instructions provided to students is available in Appendix A.

In the *Control* condition, participants were asked to evaluate education statistics from the Netherlands (the local context of the host university) and compare regionally with average EU data to determine which area of education to award additional funding. This condition required students to discuss and make inferences about the Dutch education system. Next, previous work has suggested that international students are 'ready-made resources' for enriching internationalised content in diverse classrooms (Brookes & Becket, 2010; Lowe, 2008). This assumes that assignments are focused on content from students own backgrounds. Therefore, we assigned those in *Intervention 1* to compare education statistics from their own countries of origin with one another (or, in the case of those with mobile upbringings, the country in which they completed the majority of high school) and select which context to award additional funding. An alternative suggestion is that simply incorporating content from outside the local context, regardless of students' personal experiences, can encourage interest and participation (Knight, 2004). To test this, those assigned to *Intervention 2* were randomly assigned three non-Dutch countries around the world from which their group members were not domiciled (for example, Botswana, Nicaragua and Thailand). Throughout the remainder of this article, we will refer to these conditions as '*Control*', '*Intervention 1*' and '*Intervention 2*.'

Altogether, our study included 79 participants in the Control condition, 174 participants in Intervention 1 and 175 participants in Intervention 2. We purposefully sampled more students in the intervention conditions in order to test the subtle impacts of internationalisation. We considered whether participants were sampled equally across the three conditions in terms of gender, academic performance and cultural background (using Hofstede's cultural dimensions, described in the next section). Employing an Analysis of Variance (ANOVA), we found only one significant difference in Pragmatism scores, but the overall effect was small (1.5%). Altogether, we felt confident in the similarity of participants in each condition. We additionally considered whether group dynamics were sampled equally across the three conditions in terms of average academic performance, cultural background and the number of countries represented. Employing an ANOVA, we found significant differences in a few cultural dimension scores. However, the mean differences between the conditions for these scores were relatively small in comparison to the wider Hofstede scale, and the effect sizes were moderate (less than

10%). Therefore, we again felt confident in the similarity between assigned small groups in each condition.

2.4 Instruments

2.4.1 Discourse and participation in activity

RQ1 considered individual-level student participation in group work. To measure this, we analysed several characteristics of participation in the activity. First, we considered the total number of posts submitted. However, students in this study demonstrated different ‘styles’ of participation; some opted to submit more frequent messages to their group members containing shorter phrases or sentences, while others constructed longer messages containing several sentences. Therefore, we have also analysed student participation in terms of summed word count to account for these differences.

RQ2 considered group-level participation. As with individual-level participation, we considered two characteristics of group collective participation: the total number of submitted posts and the total group word count submitted.

Finally, RQ3 considered the equality of contributions between group members. To measure this, we calculated a ‘participation range’ for each group. Individual percentages of contributions to the group were computed by dividing individual posts and word counts by the group total. We then subtracted the lowest contribution percentage from the highest contribution percentage within each group to determine the participation range. This means that a smaller participation range was seen in groups when there was more equal participation among group members, while a larger participation range indicated more disparity in contribution levels between group members.

2.4.2 Academic performance

Previous research has indicated that academic performance influences the ways in which students make connections with diverse peers (Author A et al., 2017; Author B, 2015; Singaram, van der Vleuten, Stevens, & Dolmans, 2011). We have, therefore, included academic performance in our analysis. Students in this context were enrolled in four courses during their first term, three of which were multidisciplinary and required for all first-year business students: Quantitative Methods (the course this chapter describes), Marketing and Management and Accounting. The grades for all three courses were scored on 0-10 scale, with 10 indicating a perfect score. A GPA of 5.5 is considered the cut-off for a ‘passing’ term at this university. For this study, an ‘academic performance’ variable was calculated as the average semester grade (i.e. GPA) across the three required courses.

2.4.3 Cultural traits

As this study took place in a highly diverse online environment, we considered the overall macro-level effects of cultural traits on measurable behaviours. In order to quantify overarching cultural traits for inclusion in our analysis, we used Hofstede’s cultural dimensions scores (Hofstede et al., 2010), in line with recent research (Author B & Author C, 2013; Cronje, 2011; Popov et al., 2012; Sanchez-Franco, Martinez-Lopez, & Martin-Velicia, 2009). Hofstede et al. (2010, p. 5) defined culture as, ‘the collective programming of the mind which distinguishes the members of one group or category of people from another.’ Culture, they argued, can be represented numerically on a scale of 0-100 for individual countries through a set of six dimensions or scales. First, is the Power Distance Index, which demonstrates the strength of hierarchies between individuals within societies. Individualism versus Collectivism highlights a culture’s ‘I’ versus ‘we’ focus or mentality. Next, Masculinity versus Femininity considers whether the society solves conflicts by force or through negotiation. Uncertainty Avoidance Index considers the preference for structured versus unstructured situations. Long Term Orientation versus Short Term Orientation (sometimes simply called Pragmatism) compares a culture’s focus on the immediate versus focus on the future. Finally, Indulgence versus Restraint considers the free gratification of desires versus the belief that desires should be curbed. These categorisations have been independently validated (see, for example: Merritt, 2000) and a large associated bank of research findings have used Hofstede’s dimension scores to interpret behavioural differences between cultures, collectively reaching over half a million participants in 75 countries (for a meta-analysis, see: Taras, Kirkman, & Steel, 2010).

For individual-level analysis in this research, we have assigned all six cultural dimension scores relative to students' countries of origin. For group-level analysis, we have calculated the mean score for all six traits within groups. Finally, we have considered the effects of the amount of diversity (i.e. homogeneity) within each group in terms of the number of countries present. This was calculated through a 'diversity ratio' by dividing the number of countries present by the number of total group members in each group.

2.5 Statistical analyses

Normality of all the collected data was considered by a visual review of normal distribution curves and by analysis of the skewness and kurtosis, to which all data used was within the acceptable limits of ± 2.00 (Field, 2013). Visual review of histograms and Q-Q plots was also undertaken to confirm the normality of the residuals. Given our research questions, the data were compared on both the individual and group level. For both levels, the first step in the data analysis phase was a comparison of average participation across the three RCT conditions. To accomplish this, the participation data were compared using ANOVA, with research condition allocation as the independent variable and participation measures as dependent variables. When the ANOVA indicated significant differences between the research conditions, planned contrasts between the control and intervention conditions were tested using the method described by Field (2013). As the residuals were normally distributed and the data was also collected independently between research conditions (i.e. demonstrating independence of observation), ANOVA was deemed appropriate. Levene's statistics were additionally calculated to test for homogeneity of variance, which were not significant in all cases (i.e. $p > .05$).

Regression analyses were then conducted with individual word count, individual posts and participation range as dependent variables. The independent variables included individual-level traits (cultural traits, gender and grades) and group-level traits (average cultural traits, diversity ratio and average grades). Dummy variables for research condition allocation were also included as independent variables.

Given the thematic similarities between several of Hofstede's cultural traits, it was important to consider issues surrounding collinearity in the regression models (Cortina, 1993). This was of particular importance in this data set, as there was a large cohort of German students, whose scores on three of the six Hofstede dimensions (Power Distance, Individualism and Pragmatism) were close in scale and correlated (Hofstede et al., 2010). To balance this, only Power Distance, Masculinity and Uncertainty Avoidance were included in the analysis in order to avoid collinearity and risking degrees of freedom, as done in previous research in this institutional setting (Author B & Author C, 2013). Collinearity diagnostics were conducted to test for collinearity of the remaining independent variables. All variation inflation factors were under 3.00 (i.e. 1.428, 1.520, 1.363, 1.063, 1.267, 1.375, 1.579, 1.467, 1.307, 1.228, 2.150, and 2.024), suggesting no collinearity issues (Field, 2013). To aid in the analysis and interpretation of findings, independent variables were also converted to standardised z-scores.

2.6 Ethical considerations

Students submitted an initial consent at the start of this course for their course grades, grades in other courses and biographical data to be used for research purposes. A second consent form directly related to this study was given to participants at the start of the lab activity. The study protocol and all documents used were approved by an ethical review board, in accordance with the British Education Research Association (BERA)'s ethical guidelines.

3. Results

3.1 Research Question 1: Effects on individual participation

Our first research question considered the effects of internationalised academic content on individual-level participation in an online group work activity. Altogether, participants collectively submitted a

total combined word count of 76,305 words in 6,347 posts. A breakdown of average word count and posts submitted by individuals in each research condition is highlighted in Table 1. In terms of word count submitted, those in the Control (i.e. local content) and Intervention 1 (i.e. content from students' own backgrounds) conditions participated relatively equally on average, while a *decrease* in average participation was observed for Intervention 2 (i.e. content from randomly assigned countries). In terms of posts submitted, those in the Intervention conditions posted slightly more than the control condition. This indicated that those in the Control condition on average submitted fewer, longer messages while those in the Intervention conditions submitted more frequent, but shorter messages.

<Table 1 here>

In all conditions, wide variation between participants was recorded, as demonstrated by the large standard deviations in Table 1. This outlined that regardless of academic performance level, there were large differences in participation levels when assigned either local or internationalised content. These findings are in line with previous research which has highlighted unequal participation among group members in CSDL activities (Hämäläinen & Arvaja, 2009; Strijbos & de Laat, 2010).

Differences in average individually submitted word count were compared between the research conditions using ANOVA and found to be significant [$F(2, 426) = 4.334, p = .014$]. However, the effect size was small ($\eta^2 = .020$). Planned contrasts were then used to compare the conditions on two levels. First, we compared the Control (local content) condition with both internationalisation conditions (Intervention 1 and 2). To this, findings suggested that working with internationalised content, in general, did not increase participation compared to working with content from the host country in terms of word count [$t(426) = 0.437, p = .503$]. The next planned contrast compared the two intervention conditions (Intervention 1 and 2) in order to determine if there were differences in participation when working with content from one's own background versus a randomly assigned international context. This time, the findings suggested that word count submissions were significantly higher when working with content from one's own country (i.e. Intervention 1) [$t(426) = 5.603, p = .004$].

ANOVA also demonstrated a significant difference between conditions in terms of individual posts submitted [$F(2, 426) = 4.444, p = .012$], again with a small effect size ($\eta^2 = .021$). The same planned contrasts were used to compare posts in the Control versus Intervention conditions. To this findings again indicated that internationalised academic content, in general, did increase the number of posts submitted in comparison to local content [$t(226) = 4.360, p = .037$]. The second planned contrast compared Intervention 1 and 2, and highlighted that participants made more posts when discussing content from their own cultural background compared to a randomly assigned country [$t(226) = 7.692, p = .007$]. Altogether, analysis on the individual level demonstrated that participation did increase slightly when diverse groups of students were assigned content from their own cultural backgrounds (as suggested by previous research - for example, de Haan & Sherry, 2012), but the overall effect is limited.

3.2 Research Question 2: Effects on group-level participation

In addition to individual-level contributions, our second research question considered group-level participation trends when working with local versus internationalised academic content. As depicted in Table 2, a slight increase in the average total words submitted per group was demonstrated in Intervention 1 (i.e. content from students' own backgrounds) compared to the Control condition (i.e. local content). At the same time, a sizeable *decrease* in average total word count submitted per group was found for Intervention 2 (i.e. randomly assigned international content). In terms of posts submitted, more were made on average in the Intervention conditions (working with internationalised content) in comparison to the Control condition (working with local content).

<Table 2 here>

As demonstrated at the individual level, a wide range of participation was found between groups in each condition. This was highlighted by the large standard deviations in Table 2. Larger standard

deviations were found in the Intervention conditions, which suggested stronger variations between groups when working with internationalised content.

One consideration was whether there were significant variations in participation at the group level between our research conditions. However, when conducting ANOVA with both total submitted word count and total submitted posts per group as dependent variables, no significant differences were found. This means that, regardless of whether groups were assigned local or internationalised content, there were strong variations between active and inactive groups. This suggested that, beyond the content assigned for group work, other dynamics were responsible for the quantity of total group contributions to the activity.

3.3 Research Question 3: Effects on equality of contributions between group members

Our third research question considered whether internationalised academic content leads to more equal contributions between diverse group members. In Table 1, the standard deviations of average individual contributions were smaller in the Intervention conditions, which suggested less disparity between group members. However, in Table 2, the standard deviations of average group-level contributions were larger in the Intervention conditions. This initially suggested that, while internationalisation may have led to less variation between students on a module level, there were still strong differences between groups in their collaborative experiences.

To analyse the equality of contributions between group members, the percentage of word count submitted to the group by each participant was calculated by dividing their individual submitted word count with the group total. This is depicted graphically in Figure 1, with each line representing one group and each plot point representing the percentage contributed by one group member. As groups were comprised of approximately five members, equal participation between group members would be characterised by a relatively flat line at the .20 level on the y-axis. Although wide participation variations were present in all three conditions, the trends for Intervention 1 (own country content) appeared to be more equal.

<Figure 1 here>

On a group level, one indication of more equal contributions was the disparity between the highest and the lowest contributor. To analyse this, a participation range was calculated by subtracting the lowest contribution percentage from the highest contribution percentage within each group. A more equal group, therefore, would demonstrate a lower participation range on the x-axis. As depicted in Figure 2, high variation in group-level participation within each research condition was demonstrated.

<Figure 2 here>

On average, the participation range within groups in the Control condition was 31.1% ($SD = .101$), while the participation range for Intervention 1 was 24.9% ($SD = .080$) and Intervention 2 was 27.7% ($SD = .105$). However, using ANOVA it was found that these differences were not statistically significant [$F(2, 89) = 2.706, p = .079$]. This suggested that internationalised academic content alone does not lead to more equal participation on average between group members. As with RQ2, it seems there were other group-level dynamics that influenced equal participation between diverse group members.

3.4 Further unpacking sociocultural influences on participation

The analysis so far suggested that, while internationalisation might have small impacts on participation, particularly at the individual level, other factors may continue to play a role in encouraging or discouraging participation. This is in line with previous work by the authors (Author A, 2016; Author A, 2017). Therefore, there was a need to unpack further the role of sociocultural influences and group dynamics on participation in this study through regression analyses, which are outlined in Table 3.

The first model considered predictors for individual-level word count submission. To this, findings indicated that 7.0% of the variation in individual-level word count submission could be explained by a lack of participation in Intervention 2 (i.e. randomly assigned countries). Individual

demographics and group-level dynamics also had an effect on participation, with higher participation predicted by higher-performing students, low levels of individual Uncertainty Avoidance and a lower average group Individualism score.

The second model considered predictors for individual-level posts submitted, which accounted for 5.3% of the variation between participants. In this regard, assignment to Intervention 1 (i.e. students' own country backgrounds) encouraged participation. The number of posts submitted was also impacted by academic performance, individual-level Masculinity and average group Individualism scores.

Finally considered was the participation disparity between group members, categorised by the participation range. In this model, a more equal group would be represented by a lower participation range and a negative beta coefficient. To this, findings suggested that working with data from students' own backgrounds (Intervention 1) led to more equality in participation between group members (i.e. a lower range of participation difference). At the same time, a higher amount of diversity present in the group, categorised by a higher diversity ratio within groups, led to inequality in participation between group members. This outlined that group homogeneity plays a role in contribution equality. The model overall explained 9.8% of the variation between groups.

<Table 3 here>

Altogether, the regression findings suggested that internationalised academic content which is personally relevant (i.e. from students' own backgrounds) can predict higher individual-level participation and decreased participation variation among group members. At the same time, internationalised content that is impersonal (i.e. randomly assigned from outside students' own background knowledge) can *discourage* participation. Yet, beyond internationalisation, the findings suggested that factors such as cultural backgrounds and academic performance levels were still important influences on both individual and group-level participation.

4. Discussion

Previous research has highlighted strong variations in CSCL participation (Caspi et al., 2003; Strijbos & de Laat, 2010), particularly when students come from diverse backgrounds (Angeli & Schwartz, 2016; Author A et al., 2016; Hannon & D'Netto, 2007). In this study, we considered whether internationalised academic content could improve student participation during an online collaborative assignment using a randomised control trial design. The findings indicated that internationalisation can lead to small increases in measurable individual-level participation during a CSCL assignment (RQ1). The regression analyses also found that participation in the personally-relevant internationalisation condition could predict the level of contribution equality between group members (RQ3). These findings are in line with previous anecdotal research on the benefits of internationalised curricula (Arkoudis et al., 2013; Brookes & Becket, 2010; Leask, 2009; Middleton, 2014). However, it is important to note that the effect sizes were small, meaning researchers and universities should take caution not to overstate the relationship between internationalisation and participation during particular assignments.

However, the notion that internationalised academic content can positively impact participation on an individual assignments does have implications for curriculum design. It further suggests that internationalisation might be a useful tool for teachers in diverse settings. After all, this study found participation improvements with students who already studied at a university with a strong international focus, within a highly internationalised academic programme and with frequent opportunities to work with diverse peers. One reasonable consideration, then, could be that the measured participation differences between students might be even larger in settings that have just started to internationalise (see, for example: Harrison & Peacock, 2010; Popov et al., 2012), and, therefore, have a wider gap for improvement. These improvements also suggest that internationalised academic content may help distance students' overall sense of belonging (Diep et al., 2016) and encourage engagement with diverse peers in online learning contexts, to which previous research has noted a deficiency (Angeli & Schwartz, 2016; Hannon & D'Netto, 2007). The findings from this study may additionally have wider reaching

implications for areas such as MOOCs, where recent research has highlighted a positive relationship between participation and completion (Swinerton, Hotchkiss, & Morris, 2017).

At the same time, there were still deep disparities *between* groups in terms of total participation when using both local and internationalised content (RQ2). As studies have indicated that the number of posts is indicative of conversation quality (Author B & Author C, 2009; Hou & Wu, 2011; Schellens & Valcke, 2005), this means that internationalisation did not necessarily lead to deeper or more engaging conversations for all small groups. Indeed, the findings demonstrated that other factors, such as academic performance and cultural background, also influenced individual and group-level participation, which is in line with previous work (Fozdar & Volet, 2012; Popov et al., 2012; Strauss et al., 2011). These findings also build on previous qualitative work by the authors, in which we identified wide variations in student reflections of social and cultural tensions during collaborative activities based on academic performance level (Author A et al., 2017). Therefore, while internationalisation of academic content may be useful for enriching higher education learning experiences, it alone cannot overcome the sociocultural challenges encountered by students in highly diverse settings. Therefore, it will be important for future research to unpack further how students can be best supported in building the interpersonal skills needed to work successfully with diverse peers in face-to-face, blended and online collaborative environments (Slof et al., 2016).

Also considered in this study were variations in what ‘internationalisation’ means in the context of online academic content, and whether content should be personally relevant (i.e. from students’ own backgrounds) or simply broadly intercultural (i.e. randomly assigned). To this, finding indicated that the benefits of internationalisation on participation derived almost exclusively from when students had the opportunity to work with content from their own country or background. Simply assigning content from countries around the world with which students did not have a personal connection actually *decreased* participation on average. One explanation for this might be that working on subjects outside of students’ immediate or background experiences meant that groups were unable to form a shared mental model necessary for successful collaboration (Decuyper et al., 2010; Hou & Wu, 2011; Van den Bossche, Gijssels, Segers, Woltjer, & Kirschner, 2011). This further suggested that there is indeed value in utilising student experiences as classroom resources in the internationalisation process (Brookes & Becket, 2010; Leask & Carroll, 2011; Lowe, 2008). For example, in the assignment described in this study, students were asked to use their diverse backgrounds and experiences to make inferences beyond the data to complete the task. However, few studies have considered whether students *want* to act as such ambassadors or resources from their country and whether they feel comfortable being put in such a position. It is worth considering in future research, therefore, whether there are isolation effects or further sociocultural tensions when international students are expected to work with potentially personal content from their own backgrounds.

5. Conclusions

5.1 Limitations of study

In this article, a robust randomised control trial method was used to explore the role of internationalised online content in encouraging participation in a CSCL activity. In doing so, several limitations of the study are noted. First, this study is a small snapshot of one activity against the backdrop of a wider internationalised curriculum in one specific academic programme. Although this allowed for a fine-grained analysis of student behaviours at the single assignment level, a longitudinal design or analysis across multiple academic programmes can build on these findings in order to more fully understand the long-term effects and benefits of content internationalisation. Second, Hofstede’s cultural dimensions scores have provided a macro-level understanding of general behavioural trends between students from different countries. However, we recognise that quantifying cultural traits using Hofstede’s dimension scores may not fully represent the multicultural and multi-ethnic backgrounds represented within individual nations. For this reason, follow-up qualitative research can build on these findings by illuminating individual voices and experiences on a more micro level. Third, we recognise that statistical power could be gained by analysing the hierarchical structure through multilevel analysis. Unfortunately, this was not possible given our limited sample size and is a strong consideration for future work on this topic. Finally, the focus of our research questions in this study was to analyse students’ measurable participation in terms of contribution quantity. As such, we have not attempted to

analyse elements such as contribution quality or content of conversations, nor have we measured the long-term intercultural competencies that might have been gained as a result of interaction with internationalised content. However, we recognise that these are valuable topics in need of future consideration that can build upon and triangulate the findings we have outlined.

5.2 General conclusions

This study builds on previous research on student participation in online collaborative activities. In doing so, our findings have suggested that internationalisation of online academic content can encourage individual-level participation and decrease participation disparity between group members. Blended and online learning is in a unique position to bring together students from diverse places in ways unprecedented a mere twenty years ago. As such, teachers now face challenges in encouraging participation and interaction among peers from vastly different backgrounds. These findings have outlined internationalised academic content as a potentially useful tool to overcome these difficulties, thereby strengthening the prospective benefits of computer-supported intercultural collaboration.

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Appendix A

Example instructions for lab activity (Intervention 1)

The World Bank has made a goal that every student in the world should attend a university by the year 2030. To achieve this, the World Bank will provide some countries with extra funding and support programs for education. However, they do not know which country should receive the extra support.

To better understand this problem, the World Bank has invited experts from different countries to take part in a collaborative project. You have been invited as an expert from _____ (your home country or the country where you completed the majority of high school).

Your group's goal is to evaluate education statistics to decide in which country the World Bank should provide additional funding and support in order to encourage university attendance for all students. However, it is important to keep in mind that you should not simply look for the 'lowest' statistics. This

task will require your group to make inferences beyond the data to determine where this money could be best spent.

Your group should collaborate to provide one joint answer to the following questions at the end of today's lab: In which country should the World Bank provide additional funding and support programs in order to encourage all students to attend university? Why have you chosen this country?

Table 1: Average individual contributions by research condition

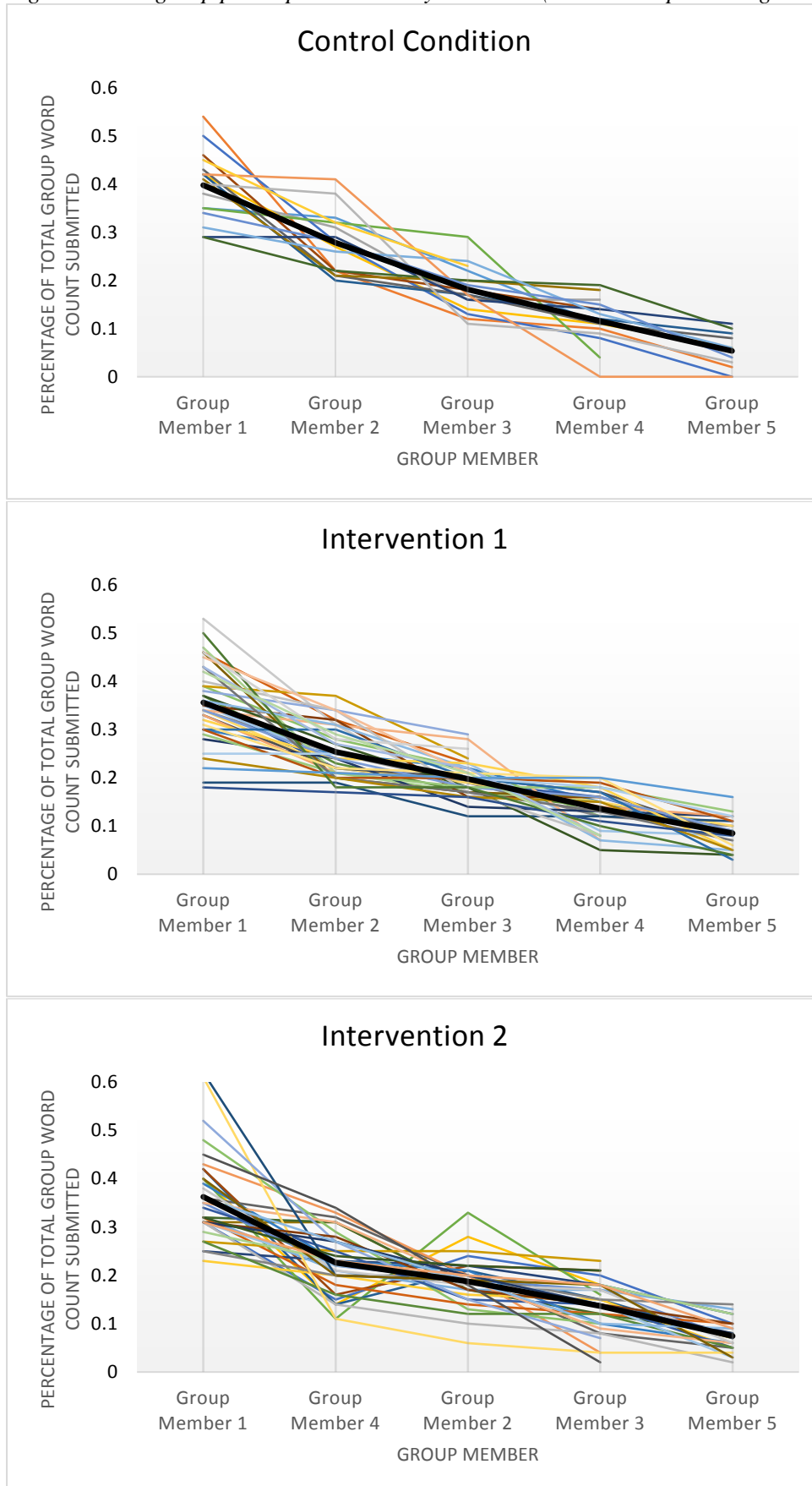
Variables	Condition	N	Mean	SD	F value	p	df	Eta squared
Individual word count submitted	Control	79	186.62	130.35	4.334*	.014	(2, 426)	.020
	Intervention 1	174	194.69	121.16				
	Intervention 2	175	159.07	103.25				
Individual posts submitted	Control	79	13.32	7.31	4.444*	.012	(2, 426)	.021
	Intervention 1	174	16.02	6.86				
	Intervention 2	175	14.39	7.49				

* $p < .05$

Table 2: Average group contributions by research condition

Variables	Condition	N	Mean	SD	F value	<i>p</i>	<i>df</i>	Eta squared
Group word count submitted	Control	17	856.24	274.71	0.898	.411	(2, 88)	.020
	Intervention 1	35	896.51	376.16				
	Intervention 2	38	790.80	321.30				
Group posts submitted	Control	17	61.12	18.79	1.696	.189	(2, 88)	.038
	Intervention 1	35	73.36	22.29				
	Intervention 2	38	71.77	26.45				

Figure 1: Intergroup participation rates by condition (each line representing one small group)



*Note: Dark black line is the average participation range across groups in the condition

Figure 2: Scatterplot of group level participation range and total word count submitted

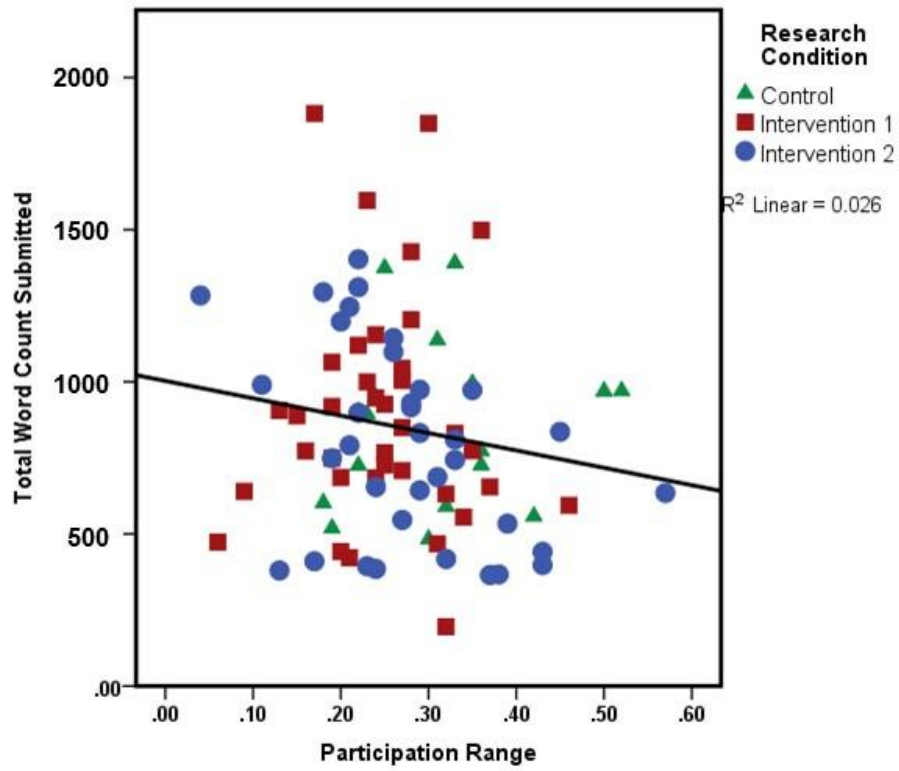


Table 3: Regression analyses of participation and individual/group level demographics (standardised beta coefficients)

	Model 1 (individual word count submitted)			Model 2 (individual posts submitted)			Model 3 (participation range within group)	
Intervention 1 (own country content)	.034	.025	.033	.184**	.173**	.189**	-.325*	-.400**
Intervention 2 (randomly assigned country)	-.116 ⁺	-.101	-.152*	.073	.086	.050	-.179	-.185
Individual level factors								
Hofstede Individualism	--	.039	.103 ⁺	--	.059	.097 ⁺	--	--
Hofstede Masculinity	--	-.076	-.088	--	-.090 ⁺	-.113*	--	--
Hofstede Uncertainty Avoidance	--	-.087 ⁺	-.111*	--	-.045	-.037	--	--
Gender	--	.005	.003	--	-.053	-.070	--	--
Grade	--	.135**	.158**	--	.107*	.121*	--	--
Group level factors								
Avg Hofstede Individualism	--	--	-.167**	--	--	-.131*	--	.036
Avg Hofstede Masculinity	--	--	.051	--	--	.056	--	-.156
Avg Hofstede Uncertainty Avoidance	--	--	.055	--	--	-.026	--	.188
Diversity ratio within group	--	--	-.013	--	--	-.077	--	.258*
Avg grade	--	--	-.040	--	--	-.022	--	.006
Adjusted R²	.015	.046	.070	.016	.042	.053	.037	.098

** $p < .01$

* $p < .05$